

SOLAR OBSERVATIONS.

SOLAR AND SKY RADIATION MEASUREMENTS DURING SEPTEMBER, 1923.

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For a description of instruments and exposures, and an account of the method of obtaining and reducing the measurements, the reader is referred to this REVIEW for April, 1920, 48:225, and a note in the REVIEW for November, 1922, 50:595.

From Table 1 it is seen that solar-radiation intensities averaged slightly below normal values for September at Washington, D. C., and close to normal at Madison, Wis., and Lincoln, Nebr.

Table 2 shows a slight deficiency in the total radiation received on a horizontal surface at all three stations.

Skylight polarization measurements obtained at Washington on five days give a mean of 57 per cent, with a maximum of 71 per cent on the 10th. At Madison, measurements obtained on two days give a mean of 65 per cent, with a maximum of 71 per cent on the 21st. These are slightly below average values for September at Madison, and close to September averages at Washington.

During the month, comparative readings were obtained between Smithsonian Silver Disk pyrheliometer No. 1, and Marvin Silver Disk pyrheliometers No. V and No. VI. These two latter instruments have been in continuous use at Madison, Wis., and Lincoln, Nebr., respectively, since June, 1918. It is gratifying to be able to state that their readings are still in accord with the Smithsonian revised pyrheliometric scale within ± 1 per cent.

TABLE 1.—Solar radiation intensities during September, 1923.

[Gram-calories per minute per square centimeter of normal surface.]

Date.		Sun's zenith distance.										Local mean solar time.	
		8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°		Noon.
		75th mer. time.	Air mass.										
			A. M.					P. M.					
			e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0		5.0	e.
Washington D. C.													
Sept. 10.....	mm.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	mm.	
12.....	9.83	0.63	0.76	0.93	1.15	1.48	1.10	0.60	.....	.....	.....	8.18
14.....	13.13	.....	.....	.....	0.82	1.15	.....	.....	.....	.....	.....	15.11
16.....	6.02	.....	.....	.....	1.42	1.18	0.90	0.73	0.61	.....	.....	5.79
17.....	6.27	.....	0.59	0.73	0.95	1.27	0.99	0.78	0.64	.....	.....	4.95
24.....	6.27	0.50	0.63	0.80	1.04	.....	0.90	0.66	.....	.....	.....	6.50
25.....	17.37	.....	.....	.....	.....	1.18	.....	.....	.....	.....	.....	16.20
25.....	15.65	.....	.....	.....	0.51	.....	.....	.....	0.33	.....	.....	16.20
Means.....	(0.56)	0.66	0.82	0.89	1.30	1.04	0.74	0.57	(0.61)	.....	.....	.....
Departures.....	-0.06	-0.06	-0.05	-0.15	-0.01	-0.01	-0.11	-0.15	-0.04	.....	.....	.....

*Extrapolated.

TABLE 1.—Solar radiation intensities during September, 1923—Contd.

Date.	Sun's zenith distance.										Noon.		
	8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°			
	75th mer. time.	Air mass.										Local mean time.	
		A. M.					P. M.						
		a.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0		e.
Madison, Wisconsin.													
Sept. 5	mm.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	mm.		
8	15.11					1.11					16.79		
10	8.81				1.28						7.87		
13	7.57			1.06	1.16						9.47		
21	4.37				1.31						4.57		
	5.48				1.32	1.45					8.81		
Means				(1.06)	1.27	(1.28)							
Departures				+0.04	+0.10	-0.09							
Lincoln, Nebr.													
Sept. 3	13.13		0.81	0.95	1.14						12.24		
4	12.24		0.70	0.85	1.00	1.23					10.59		
5	13.61	0.59	0.71	0.86	1.07	1.29					14.60		
7	7.04		0.97	1.11	1.28	1.48					5.16		
8	6.27	0.87	0.95	1.06	1.26	1.43	1.22	1.05	0.93	0.83	7.57		
9	7.87	0.81	0.92	1.06	1.23	1.46	1.21	1.03	0.87	0.77	7.57		
12	7.29		0.93	1.07	1.22						6.76		
13	7.29						1.16	1.02	0.87	0.76	6.02		
21	8.18			0.91	1.07						8.48		
29	13.61						1.03				17.37		
30	12.24					1.41					13.61		
Means		0.76	0.86	0.98	1.16	1.38	1.16	1.03	0.89	0.79			
Departures		+0.01	+0.01	-0.02	-0.02	-0.01	-0.02	+0.06	+0.06	+0.06			

TABLE 2.—Solar and sky radiation received on a horizontal surface.

Week beginning.	Average daily radiation			Average daily departure for the week.			Excess or deficiency since first of year.		
	Washington.	Madison.	Lincoln.	Washington.	Madison.	Lincoln.	Washington.	Madison.	Lincoln.
	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.
Sept. 3...	279	342	534	-117	-35	+96	-4,011	-226	-1,286
10...	423	368	359	+43	+17	-54	-3,740	-110	-1,643
17...	257	254	311	-108	-74	-82	-4,498	-625	-2,215
24...	376	260	311	+27	-46	-64	-4,309	-325	-2,661